SECONDARY SCHOOL ANNUAL EXAMINATIONS 2009
Directorate for Quality and Standards in Education
Educational Assessment Unit

FORM 4 (Option)   **COMPUTER STUDIES**   **TIME: 1h 30min**

Name: _____   **Class:** _____

*Directions to Candidates:*

    *Answer **ALL** questions in **Section A** on this paper;*
    *Answer **ALL** questions from **Section B** on separate foolscaps;*
    The use of flow chart template is permitted;
    *Calculators are **NOT** allowed;*
    Good English and orderly presentation are important.

For office use only:

Question	1	2	3	4	5	6	7	8	9	10	11	12	13	Paper Total	Course Work	Final Mark
Max	5	5	5	5	5	5	5	5	5	5	5	15	15	85%	15%	100%
Mark																

Section A - Answer all Questions

1 The following are an incomplete **logic circuit** and its incomplete **truth table**. The two circles 'C' and 'X' are representing two logic gates.
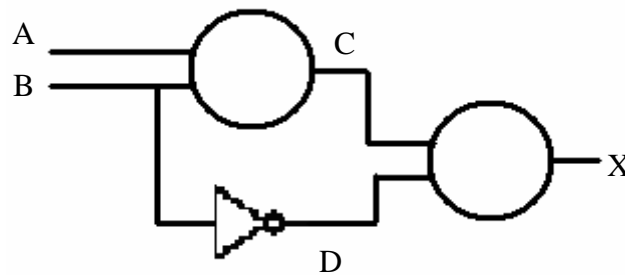
A	B	C	D	X
0	0			
0	1	1	0	0
1	0			
1	1			

   i.   Study the circuit and the truth table above and fill the circles 'C' and 'X' with the appropriate **logic gate** (AND and/or OR).

  ii.   Complete the **truth table** to match the given logic circuit.

[5]

2 Draw a labeled **block diagram** of a computer system. Your diagram should include the following components: **CPU**, **Central (Main) Memory unit**, **ALU**, **Control unit**, **Accumulator**, **Input device**, **Secondary storage device** and **Output device**.
Use arrows to show the **flow of data** between the components.
Space for diagram

[5]

3   Application software may be **tailor-made** or **off-the-shelf**.
   i.   What is the **difference** between the two types of software?
   ii. Give one **advantage** and one **disadvantage** of buying off-the-shelf
       software.
   iii. Give one **advantage** and one **disadvantage** of tailor-made software.

   i.   **Difference:** _____

   ii. **Off-the-shelf.**
        Advantage: _____
        _____

        Disadvantage: _____

   iii. **Tailor-made.**
        Advantage: _____
        _____

        Disadvantage: _____
        _____

                                                                    [5]

4   (a)   i.   What does the acronym **CAL** stand for?
             ii. State whether CAL is a **technical** or **educational** application of computers.

        i.   **CAL:** _____

        ii. **Application:** _____
                                                                    [2]

        (b)   **CAD** and **CAM** are two other computer applications.
             i.   What do the acronyms **CAD** and **CAM** stand for?
             ii. What is the **relationship** between them?

        i.   **CAD:** _____

             CAM: _____

        ii. **Relationship:** _____
             _____
                                                                    [3]

5   Complete the table below to show each number in **binary (8 bit)**, **hexadecimal**
       and **decimal**. *Space for working is available on the next page.*

Binary	Hexadecimal	Decimal
0 0 1 1 0 1 0 1		
	C4	
0 1 0 0 0 0 0 1		65

Working Space:

[5]

6 (a) What is the **instruction set** of a computer?

Instruction set:

[1]

(b) Explain the difference between the **data bus** and the **address bus.**

Data bus:

Address bus:

[2]

(c) Write down whether the following are **True** (T) or **False** (F).

T or F

i. The wider the data bus the slower the computer system.

ii. The address bus locates particular memory locations.

[2]

7 The six main steps of the **Fetch Execute Cycle** are given below; however they are not in the correct order. Number the steps from 1 to 6 to show the correct order. *The last step (6) has been marked as help.*

_____ Control unit places opcode in Instruction register

__6__ Go back to step 1

_____ Control unit increments program counter to point to next instruction

_____ Control unit fetches any required operand

_____ Control unit activates necessary circuits to execute instruction

_____ Control unit fetches the opcode from memory location indicated by program counter

[5]

8 (a) What is the difference between the two Pascal functions **SQR** and **SQRT**

SQR:

SQRT:

[2]

(b) Write a Pascal **program** which calculates the **volume of a cylinder**. The program should:
- ask the user to input the radius and the height of a cylinder; and
- calculates and outputs the volume to 2 decimal places.

The formula to find the volume of a cylinder is $\pi r^2 h$, where 'r' is the radius, 'h' is the height and $\pi = 3.143$.
Space for program

[3]

9 i. What is a **register**?
ii. The **accumulator**, **instruction register** (IR) and **program counter** (PC) are three registers found inside the CPU. In which **subunit** of the CPU is each register found?
iii. An **8-bit register** is used to store binary integers. What is the **largest integer** that may be stored in this register?

i. **Register:**

ii. **Accumulator:**

IR:

PC:

iii. **Largest integer:**

10 One type of documentation that comes with software is the **User documentation**.
(a) Name the other **two types** of documentation.

1ˢᵗ type: _____

2ⁿᵈ type: _____

[2]

(b) What is the difference between the **User documentation** and one of the documentation you mentioned in part (a) above?

User documentation: _____

_____

Documentation of part 'a': _____

_____

[2]

(c) Mention one **section/feature** that you expect to find in the User's documentation.

Section/Feature: _____

_____

[1]

11 The following are the seven stages of the **systems analysis** exercise. However the stages are not in the correct order. **Number each stage** so that they are in the correct order.
The first and the last stages have been numbered as help.

Design of new computerized system.	
System maintenance.	**7**
Programming and documentation.	
Control and review.	
Present system study and analysis.	
Project selection and feasibility study.	**1**
Implementation and changeover methods.	

[5]

Section B – Answer BOTH Questions

12 (a) **Algorithms** and **flowcharts** are useful problem solving tools. Briefly explain the **difference** between them.
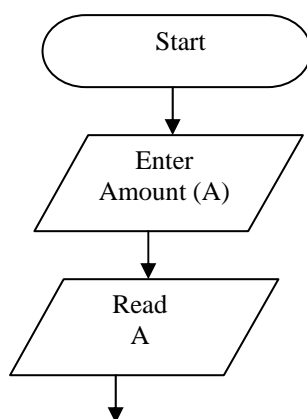
[4]

(b) The formula to calculate the **simple interest** (SI) over a period of years is:

$$SI = A*R*T/100$$

where 'A' is the amount of money deposited , 'R' is the interest rate as a percentage and 'T' is the number of years.

Copy and **complete** the following drawing to enter the required data so that t.
simple interest may be calculated and outputted.

[7]

(c)   Copy and complete the table below using the following four Pascal **data types**:

Real   Character   Integer   String

Example	Data type
56	
k	
computer	
3.78	

[4]

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13 (a) **Transcription** errors are those generated during the entry of data in a computer.
For example, typing in 1243 instead of 1234. Give the **name** and an **example** of
each of the three types of transcription errors.   [6]

(b) **Data verification** and **data validation** are two methods of checking for data
integrity. Explain the difference between the two methods.   [4]

(c) **Range check** is one data validation method. What is a **range check** and give an
example where a range check may be used.   [2]

(d) A **check digit** is another method of validating data. For example, given the data:
34567**5**, the check digit is **5** (the first digit from the right). The check digit was
calculated as follows:
1. Add all the digits of the data together: $3 + 4 + 5 + 6 + 7 = 25$
2. Divide the result by 10 and write the remainder: $25 \div 10 = 2$ remainder 5
3. The remainder is the check digit: **5** is the check digit

Use the same method to calculate the **check digit** for the data: 332145   [3]